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U. S. DEPARTMENT OF AGRICULTURE

LEGUME COVER CROPS TO BOOST PRODUCTION In The South

AWI–67 Issued September 1943

U. S. DEPARTMENT *of* AGRICULTURE

Cover Crops for Winter

PROMINENT among the practices for increasing the productivity of farms in the South is the use of winter cover crops. Not only do such crops cover the land during a season when no food or fiber crop is being grown but they also increase the soil's fertility when they are later plowed under as green manure. Legumes as cover crops have a further value because of their addition of nitrogen to the soil, it having been estimated, for example, that an acre of legumes takes from the air and deposits in the soil a quantity of nitrogen equal to that released in one firing of a 16-inch gun.

Cover crops are especially valuable in the Southern States, as they can be planted in fall and grown throughout the winter season, when the land would otherwise be bare. They prevent erosion, take up leaching plant nutrients that would be lost, and add organic matter to the soil. And that is not all—later, during the period of decay, following the turning under of the cover in spring, they make plant nutrients available to the subsequent crops.

The benefits of added fertility, reduced erosion, and increased production of cash crops have spurred the farmer on to plant more and more cover crops. In the past 10 years such plantings in the South have increased from several hundred thousand acres to several millions.

This pamphlet was written by Roland McKee, senior agronomist, Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration.

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AGRICULTURAL RESEARCH ADMINISTRATION
BUREAU OF PLANT INDUSTRY, SOILS, AND
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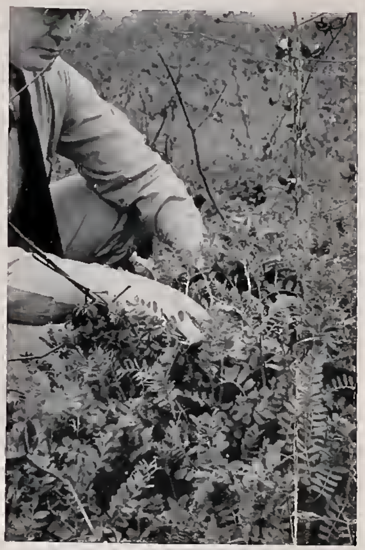

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Legumes vs. *Nonlegumes*

Leguminous crops obtain part of their nitrogen from the air through the interaction of bacteria in nodules or tubercles on their roots. On the other hand nonleguminous crops—among which are corn and other grains, cotton, and the grasses—take all their nitrogen from the soil. In general, the legumes contain a larger percentage of nitrogen than the nonlegumes and consequently are superior for soil improvement, an important consideration when nitrogenous fertilizers are expensive to buy.

Inoculation of Legumes

When a leguminous crop is planted for the first time, the soil may not contain the nodule-forming bacteria, and these must be supplied by inoculation of the seed. Inoculations are made with commercial cultures or with soil from a field that has recently grown the same kind of crop as the one being planted. Many farmers use both. Commercial cultures are used in accordance with directions on their packages. Soil containing bacteria is mixed with the seed at the rate of half a bushel or more an acre and drilled, or it is broadcast at the rate of 400 to 500 pounds an acre and worked into the soil before seeding.

After the seedlings break through the ground, a second inoculation is sometimes made. For this inoculation, enough commercial culture for a bushel of seed is mixed with 50 to 60 pounds of moistened cottonseed meal, sand, or soil, and this is broadcast over the field in rainy or cloudy weather so that sunshine

will not kill the bacteria. This second treatment seems to supply living bacteria to the seedlings just when many of the young plants need them most, and it pulls them through to provide a good stand.

Adapted Cover Crops

The most widely used legume cover crops are the Austrian Winter pea, hairy vetch, and crimson clover, but several others, including bur-clover, common vetch, monantha vetch, and lupine, also are sown, as also is the nonlegume rye. Much of the seed used in the South is obtained from the Northwest, but seed produced either locally or in the latitude where it is to be sown will usually give satisfactory results. Only seed of known local adaptation should be used.

Preparation of the Seedbed

A large percentage of the winter-legume acreage is planted following cotton, in which case little or no seedbed preparation is necessary. This also holds when the legumes are preceded by cowpeas, soybeans, or Spanish peanuts. Under such conditions the seed is either drilled or broadcast and disked in, provided the previous crop has been harvested sufficiently early. If for any reason the land needs flat breaking, preparation is more expensive and requires more time. On clayey soils where weed growth is considerable or the ground is hard-packed, plowing or heavy disking is essential to a good seedbed. With large-seeded crops, such as field peas, there is little danger of covering the seed too deep, but with

small-seeded crops, such as crimson clover, it is necessary for best results to work the soil down into a firm, compact condition before seeding.

Use of Fertilizers

For the initial planting of a cover crop, more fertilizer is needed than in subsequent plantings because of the residual effect of the decayed earlier cover crop and the fertilizer. At the time of planting, an application of 200 to 400 pounds an acre of 20 percent superphosphate or equivalent is recommended, the quantity depending upon the natural fertility of the soil and the extent of fertilizer application on the preceding cash crop. Basic slag can be substituted for superphosphate, but in this case nearly double the weight of material should be applied. Superphosphate cannot be safely used in fertilizer attachments on seed drills, as it will kill the inoculating bacteria if it comes in contact with the seed. Basic slag, however, can be used in this way without harmful effects.

Planting

The time of occurrence of fall rains governs in part the time for seeding fall cover crops. When soil moisture is available, seedings should be made from September 15 to October 15, depending on latitude. In the extreme South, later planting is common; in the latitude of Virginia, September 15 is about the optimum date. Seedings can be made broadcast or in drills. The latter method conserves seed, but if it is used with fertilizer attachments basic slag should be chosen for the reason given above. When seeding in cotton or corn,

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the seed should be drilled on either side of the row and on the ridge, but not in the low middle. The rate of seeding varies, as specifically indicated in the paragraphs on individual crops.

Volunteering a Winter Legume

Few winter legumes will mature seed under Cotton Belt conditions and volunteer a good stand the following year. Bur-clover, however, will do this, as also will rough pea (also known as Caley pea and Singletary pea). Augusta vetch (also known as narrowleaf vetch), and several other minor legumes. Locally adapted strains of crimson clover can be volunteered by plowing the crop under fairly deep when ripe and later in summer working it to the surface. When conditions are right this will give a good stand and is a satisfactory practice. Hairy vetch will mature enough seed to volunteer under favorable conditions, but the comparatively late season of maturing and the likelihood of damage by the corn earworm usually make volunteering inadvisable.

Turning the Cover Crop

As a general rule, a cover crop should be worked into the soil about 2 weeks before planting a subsequent crop. This can be accomplished with a turning plow or a disk. To delay turning under the cover crop in order to get additional legume growth not only makes the planting season late but increases the possibility of encountering weather that will be hotter and drier and unfavorable to the decomposition of the cover crop.

Use in Victory Gardens

During any period when the family vegetable garden is not occupied with regular plantings a cover crop should be grown. A maximum degree of fertility is needed in the garden and a cover crop can help in attaining this end. For winter use, Austrian Winter peas and crimson clover are the best legumes available. For summer, Crotalaria, soybeans, or cowpeas are recommended. Keep the ground covered to prevent the leaching of plant nutrients, to supply organic matter for improving the tilth, and to add fertility or needed plant nutrients.

Grazing Winter Cover Crops

The shortage of feed for livestock in winter makes it desirable sometimes to graze the cover crop, when this can be done without seriously impairing its value for soil improvement. This is especially true of early fall plantings that have made a good growth before cooler weather arrives. Do not, however, graze the cover close, as this will reduce its value in controlling erosion and will greatly lessen its fertilizing value.

Diseases

The cover crop that has been most affected by disease is the Austrian Winter pea. Several leaf spots and root rots have done serious damage to this crop in sections where peas have been grown more or less continuously. Although no way is known for preventing these diseases, their damage can be greatly reduced by proper rotation. If peas are not planted on the same area oftener than once in 3 years the damage will be greatly reduced. Longer rotations would be even more effective, and they often can be easily used.

Austrian Winter Pea

The Austrian Winter pea leads all other winter annuals for cover crops and green manuring in the South. It is entirely winter hardy, vigorous, and yields well. The average rate of seeding is about 40 pounds to the acre. In the northern part of the Cotton Belt, seeding should be about September 15, while in the extreme South, October 15 is usually best. Superphosphate at the rate of 200 to 400 pounds an acre should be used at the time of seeding, except on lands on which the cotton, corn, or other crop is heavily fertilized. Inoculation is essential, and the use of both soil and pure cultures is recommended, the soil culture being desirable when soil that is free from insects and diseases can be obtained locally.

Vetch

The vetches (see illustration on cover) are among the strongest growing of the annual legumes and furnish splendid winter pasture and hay. Being widely adapted, they are among the legumes best suited to the South. Hairy vetch and smooth vetch are excellent to use in mixture with oats or rye for winter pasture. When so used, about 1 bushel of the grain and 15 to 30 pounds of vetch should be sown in September and October. Inoculation is essential, and the use of both soil and pure cultures is recommended. When the vetch, or vetch mixture, is pastured in winter, livestock should be removed from it fairly early in spring to permit growth for a good cutting of hay or covering of green manure. If the stand is cut when mature, sufficient seed will often shell and scatter to volunteer the next crop.

Crimson Clover

Crimson clover is a winter annual and does well as a cover crop from New Jersey south to central Georgia. It should be sown at the rate of 15 to 25 pounds an acre, from late in August to October, or when the first good fall rain sets in. It is commonly sown in corn or other cultivated crops following the last cultivation either just before or just after a soaking rain. Inoculation should be practiced on fields where the crop has not been grown before. Unhulled home-grown seed is much used in the South. Sowing the unhulled seed at the rate of 40 to 50 pounds an acre gives a surer stand than hulled seed, especially on soils subject to severe September drought. Crimson clover furnishes late fall and winter pasturage of good quality and in spring is sometimes cut for hay. Its principal use, however, is as a green-manure crop, and for this use it fits fairly well into the cotton-cropping system.

Bur-clover

Bur-clover is a winter-growing legume adapted as a winter cover crop in the section from Tennessee and North Carolina southward. When cleaned seed is used, inoculation should be practiced, but the particles of soil picked up by the burs carry sufficient bacteria for the purpose. Properly handled, it will volunteer and may be alternated with a summer-hoed crop. Poor soils are not to its liking, and a fertilizer high in superphosphate should be used in establishing the crop. Bur-clover is recommended for use only on soils of good fertility.

Lupine

The blue lupine, a strong-growing winter annual, is adapted to the lower South. As it contains a poisonous alkaloid, however, *it can be used as a cover crop only, not for forage.* Seeded at the rate of 75 pounds to the acre, it will make an excellent winter cover. The seed can be easily produced locally in the South, and for this reason it is especially recommended.

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